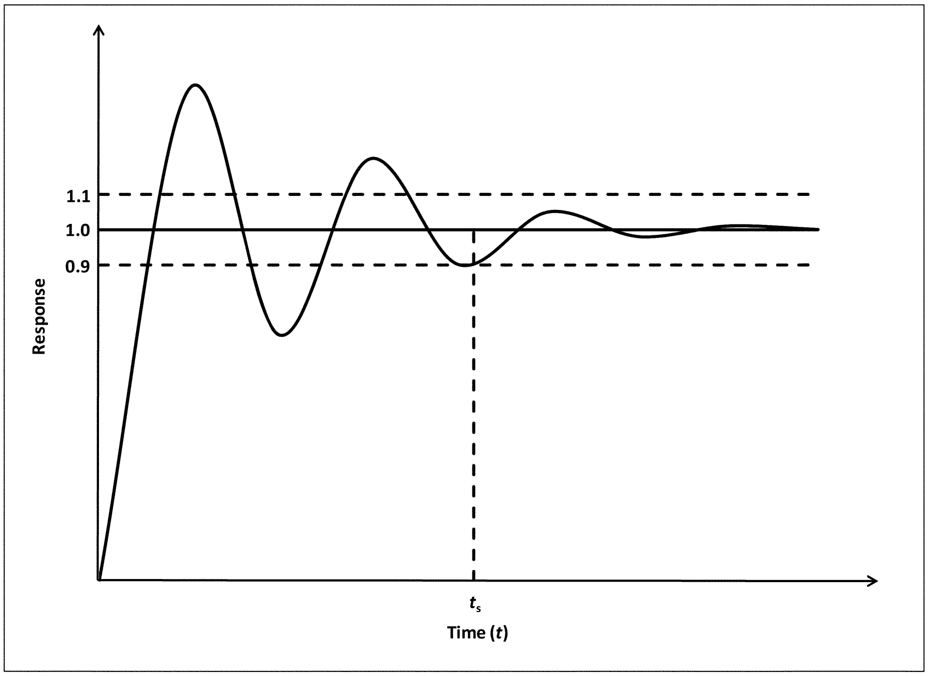
Figure 1 of § 1066.245—Example of a settling response time diagram



§ 1066.250 Base inertia verification.

(a) *Overview*. This section describes how to verify the dynamometer's base inertia.

(b) *Scope and frequency*. Perform this verification upon initial installation and after major maintenance, such as maintenance that could affect roll inertia.

(c) *Procedure*. Verify the base inertia using the following procedure:

(1) Warm up the dynamometer according to the dynamometer manufacturer's instructions. Set the dynamometer's road-load inertia to zero, turning off any electrical simulation of road load and inertia so that the base inertia of the dynamometer is the only inertia present. Motor the rolls to 5 mph. Apply a constant force to accelerate the roll at a nominal rate of 1 mph/s. Measure the elapsed time to accelerate from 10 to 40 mph, noting the corresponding speed and time points to the nearest 0.01 mph and 0.01 s. Also determine average force over the measurement interval.

(2) Starting from a steady roll speed of 45 mph, apply a constant force to the roll to decelerate the roll at a nominal rate of 1 mph/s. Measure the elapsed time to decelerate from 40 to 10 mph, noting the corresponding speed and time points to the nearest 0.01 mph and 0.01 s. Also determine average force over the measurement interval.

(3) Repeat the steps in paragraphs (c)(1) and (2) of this section for a total of five sets of results at the nominal acceleration rate and the nominal deceleration rate.

(4) Use good engineering judgment to select two additional acceleration and deceleration rate pairs that cover the middle and upper rates expected during testing. Repeat the steps in paragraphs (c)(1) through (3) of this section at each of these additional acceleration and deceleration rates.

(5) Determine the base inertia, I_b, for each measurement interval using the following equation:

$$I_b = \frac{F}{\left|\frac{v_{final} - v_{init}}{\Delta t}\right|}$$

Eq. 1066.250-1

Where:

F = average dynamometer force over the measurement interval as measured by the dynamometer.

v_{final} = roll surface speed at the end of the measurement interval to the nearest 0.01 mph.

v_{init} = roll surface speed at the start of the measurement interval to the nearest 0.01 mph.

Δt= elapsed time during the measurement interval to the nearest 0.01 s.

Example:

$F = 1.500 \text{ lbf} = 48.26 \text{ ft·lbm/s}^2$

$v_{final} = 40.00 \text{ mph} = 58.67 \text{ ft/s}$

$v_{init} = 10.00 \text{ mph} = 14.67 \text{ ft/s}$

$\Delta t = 30.00 \text{ s}$

$$I_b = \frac{48.26}{\left|\frac{58.67 - 14.67}{30.00}\right|}$$

$I_b = 32.90 \text{ lbm}$

(6) Calculate the base inertia error, I_{berror}, for each of the thirty measured base inertia values, I_b, by comparing it to the manufacturer's stated base inertia, I_{bref}, using the following equation:

$$I_{\text{berror}} = \frac{I_{\text{bref}} - I_{\text{bact}}}{I_{\text{bref}}} \cdot 100\ \%$$

Eq. 1066.250-2

Example:

I_{bref} = 32.96 lbm

I_{bact} = 32.90 lbm (from paragraph (c)(5) of this section)

$$I_{\text{berror}} = \frac{32.96 - 32.90}{32.96} \cdot 100\ \%$$

$$I_{\text{berror}} = 0.18\ \%$$

(7) Determine the base inertia mean value $\bar{I}_b$, from the ten acceleration and deceleration interval base inertia values for each of the three acceleration/deceleration rates. Then determine the base inertia mean value, $\bar{I}_b$, from the base inertia values corresponding to acceleration/deceleration rates. Calculate base inertia mean values as described in 40 CFR 1065.602(b)

(8) Calculate the inertia error for the final base inertia mean value from paragraph (c)(7) of this section. Use Eq. 1066.250–2, substituting the final base inertia mean value from paragraph (c)(7) of this section for the individual base inertia.

(d) *Performance evaluation*. The dynamometer must meet the following specifications to be used for testing under this part:

(1) All base inertia errors determined under paragraph (c)(6) of this section may not exceed ±1.0%.

(2) The inertia error for the final base inertia mean value determined under paragraph (c)(8) of this section may not exceed ±0.20%.

§ 1066.255 Parasitic loss verification.

(a) *Overview*. Verify the dynamometer's parasitic loss as described in this section, and correct as necessary. This procedure determines the dynamometer's internal losses that it must overcome to simulate road load. Characterize these losses in a parasitic loss curve that the dynamometer uses to apply compensating forces to maintain the desired road-load force at the roll surface.

(b) *Scope and frequency*. Perform this verification upon initial installation, after major maintenance, and upon failure of a verification in either § 1066.270 or § 1066.275.

(c) *Procedure*. Perform this verification by following the dynamometer manufacturer's specifications to establish a parasitic loss curve, taking data at fixed speed intervals to cover the range of vehicle speeds that will occur during testing. You may zero the load cell at a selected speed if that improves your ability to determine the parasitic loss. Parasitic loss forces may never be negative. Note that the torque transducers must be zeroed and spanned prior to performing this procedure.

(d) *Performance evaluation*. Some dynamometers automatically update the parasitic loss curve for further testing. If this is not the case, compare the new parasitic loss curve to the original parasitic loss curve from the dynamometer manufacturer or the most recent parasitic loss curve you programmed into the dynamometer. You may reprogram the dynamometer to accept the new curve in all cases, and you must reprogram the dynamometer if any point on the new curve departs from the earlier curve by more